

REMARKS

The Examiner is thanked for the due consideration given the application.

Claims 1-5, 7-13, 16-17, and 20-27 were examined.

Support for amendments to the specification and claims 1 and 13 can be found, e.g., from Fig. 3a and page 6, lines 16-19 of the specification. Specifically, Fig. 3 depicts that the surface level is kept between two limit values and the range of variation between these limit values is narrower than the range between empty and full tank, for instance the lower limit points 'b', 'd', 'f', and 'h' correspond to a situation in which the tank is not empty. Therefore, the amendments are supported by Fig 3a and by the text passages explaining Fig. 3a in the description at page 6, lines 16-19. Claims 1 and 13 are also amended accordingly.

No new matter is entered by these amendments.

Claim Rejections - 35 USC § 103

Claims 1, 3-5, 7-13, 16-17, and 20-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Struthers (US Patent 6,481,973) in view of Rishel (US Patent 4,945,491).

Claim 2 was rejected under 35 U.S.C. 103(a) as being unpatentable over Struthers in view of Rishel as applied to claims 1, and further in view of Dryden (US Patent 2,462,076).

Traverse

In the technical solution recited in the amended independent claims, the pump rotation speed is controlled as a response to two different situations in each of which the liquid surface level reaches a certain value from a certain direction, i.e. in terms of the amended independent claims:

(a) a first moment (e.g. moment 'a' in figure 3a) when a liquid surface level reaches a first value of the liquid surface level from a predetermined direction is detected,

(b) as a consequence of the detection of the first moment, pump rotation speed of one of at least two pumps is controlled to a first value of the pump rotation speed at which amount of transferred liquid relative to consumed energy is at maximum,

(c) one of at least two pumps is run at the first value of the pump rotation speed in order to move the liquid surface level in a direction opposite to the predetermined direction,

(d) there is detected a second moment (e.g. moment 'b' in figure 3a) when the liquid surface level reaches, from the direction opposite to the predetermined direction, another value of the liquid surface level that is later in the direction opposite to the predetermined direction than the first value of the liquid surface level, and

(e) as a consequence of the detection of the second moment, one of at least two pumps is controlled to be stopped so as to keep the surface level between the first value and the other value of the liquid surface level, the change of amount of liquid in the tank when the surface level changes between said first value and the other value of the liquid surface level being smaller than the whole volume of the tank.

Neither Struthers nor Rishel discloses the above-mentioned technical feature (e) of the amended independent claims.

The technical solution defined in the amended independent claims makes possible to have the pumping system in which the liquid surface can be kept between two pre-determined limit values and the pumps can be used so that each pump is either de-energized, i.e. no losses, or run at a speed at which amount of transferred liquid relative to consumed energy is at maximum. Accordingly, the liquid surface can be kept between the two pre-determined limit values with minimal energy consumption without a need to determine the wire-to-water efficiency through online because the speed at which amount of transferred liquid relative to consumed energy is at maximum which can be determined through offline.

In that regard, Rishel fails to disclose the feature claimed in the present invention because Rishel discloses that there is a need to determine the wire-to-water efficiency

through online during operation. Particularly, Rishel teaches a method to monitor and determine the efficiency in order to be able to control the system. See, an abstract.

On the other hand, Struthers does not even handle the problem of optimizing the efficiency of a pumping system. Instead, Struthers deals with achieving a desired pumping rate and recovering from clogging situations.

Further, Struthers's relevant portion of the control process of the system is directed solely to emptying the tank, rather than maintaining a particular rate of flow. Thus, Struthers fails to disclose the following technical feature of the amended independent claims:

"keep the surface level between said first value and the other value of the liquid surface level, the change of amount of liquid in the tank when the surface level changes between said first value and the other value of the liquid surface level being smaller than the whole volume of the tank".

Struthers's relevant portion of the control process of the system directed solely to emptying the tank is also recognized by the Office in item 30 of the Office Action.

As noted above, the cited prior art's teachings undermine the very reason being proffered as to why a skilled artisan would modify Struthers's system which is for emptying the tank to arrive the claimed invention which would be configured to keep the surface level between two values of the

liquid surface level, where the change of amount of liquid in the tank when the surface level changes between the two values is smaller than the whole volume of the tank.

Therefore, independent claims 1 and 13 are non-obvious over Struthers, either alone or with Rishel. The dependent claims are also non-obvious at least for depending from non-obvious independent claims. And because the combination of Struthers and Rishel are non-obvious over independent claims 1 and 13, the proposed combination of Struthers, Rishel, and Dryden does not render obvious present claim 2.

Reconsideration and allowance of the claims are respectfully requested.

This response is believed to be fully responsive and to put the case in condition for allowance. Entry of the amendment, and an early and favorable action on the merits, are earnestly requested. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any

additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

/Roland E. Long, Jr./
Roland E. Long, Jr., Reg. No. 41,949
209 Madison Street
Suite 500
Alexandria, VA 22314
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709